George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Materials and Processes Laboratory, EM01

Metals Engineering Branch, EM30

EM30-WI-010
02/11/2005

ORGANIZATIONAL WORK INSTRUCTION

EM30

MICROMETER & CALIPER VERIFICATION PROCEDURE

RELEASE AUTHORITY	NAME	TITLE	ORG	DATE
Management Representative	_____ Timothy P. Vaughn	Branch Chief	EM30	02/11/2005

CHECK THE MASTER LIST--ONLY THE LATEST REVISION IS VALID

DOCUMENT HISTORY LOG

Revision	Date	Originator	Description
Baseline	2-11-2005	N. Ogozalek	Document rebaselined due to reorganization of Departments and Laboratories at the Center.

1 SCOPE

1.1 SCOPE: This document provides the verification procedure for micrometers and calipers used by the Materials and Processes Laboratory, Metals Engineering Branch (EM30), Metallic Materials Engineering Team.

1.2 PURPOSE: This Work Instruction shall be used to check the accuracy of micrometers and calipers utilized by EM30 for dimensional measurements associated with plating operations.

1.3 APPLICABILITY: This document is applicable to the Materials and Processes Laboratory, Metals Engineering Branch (EM30), Metallic Materials Engineering Team and support personnel who engage in plating activities in Room 1124, Building 4612.

2 APPLICABLE DOCUMENTS

2.1 MPR 8730.5 Control of Inspection, Measuring, and Test Equipment

2.2 EM30-WI-002 EM30 Work Tracking, Product Traceability and Control, and Data Control

3 DEFINITIONS

3.1 None

4 PROCEDURE

4.1 Micrometers or calipers accuracy shall be verified as required by the task being performed or as specified on Electronic Work Request Form located at the website http://ed33mmtfa/PublicMMTF/WorkRequest.aspx.

4.2 Record the micrometer/calipers measurement data on the Micrometer Verification Logsheet, EM30-Form-04.

4.3 Ensure the micrometer measurement surfaces (tips) are clean.

4.4 Zero the micrometer before beginning and check the zero for drift periodically during the verification process.

4.5 Select at least three (3) calibration blocks that bracket the dimensional range of each of the items to be measured. Gauge Blocks, Calibration Identification # M636978; Thickness Gauge Set, # M652805; or equivalent, shall be used.

4.6 Ensure the calibration blocks are clean and lint free. Wash with denatured ethanol or acetone; wipe with soft, lint-free cloths; and blow dry with missile grade air as required.

4.7 Take a minimum of four (4) thickness measurements on each calibration block with the area measured spaced evenly across the block to give representative measurements.

4.8 Average the measurements for each calibration block. The average measurement obtained should be within $\pm$ 5 points of the known calibration block dimension of the gauge block

4.8.1 For example, if the gauge block thickness is calibrated at 0.100 inches, then the acceptable measurement range average for the micrometer is 0.095 to 0.105 inches.

4.8.2 Or, if the block thickness is 0.1000 inches, then the acceptable range is 0.0995 to 0.1005 inches.

4.9 If the average reading is not within specifications, re-zero the micrometer or caliper, clean the tips as required, and repeat the measurements. Record all corrective actions taken and all measurements.

4.10 If an acceptable average reading can not be obtained for two (2) or more calibration blocks:

4.10.1 If the calibration blocks are suspect, submit the set to the Calibration Laboratory for recalibration. Recheck the micrometer or caliper using different gauge blocks.

4.10.2 If the micrometer or caliper accuracy is suspect, submit the micrometer for repair.

5 NOTES

5.1 None

6 APPENDICES, DATA, REPORTS, AND FORMS

6.1 Micrometer and Caliper Verification Logsheet, EM30-Form-04

6.2 EM30 Metals Engineering Branch Calibration Logbook.

7 QUALITY RECORDS

7.1 The following listing includes EM30 Quality Records that are collected and saved during calibration activities.

7.1.1 EM30-Form-04 – include with the data package of the specific work request for which the verification was performed

7.1.2 Room 1124 Logbook – record in the logbook the EM30 work request number

7.2 All schedules pertaining to EM30 Quality Record retention and disposition are compiled in the EM30 Quality Records Listing located on the master list of the EM30 group website http://maptis.nasa.gov/em30/em30masterlist

8 CALIBRATION

8.1 Instrumentation calibration category designation is as specified according to MPR 8730.5.

8.2 Micrometers and calipers utilized in the Plating Facility, Room 1124, Building 4612, are designated as Calibration Category I.

8.3 Verification frequency shall be conducted as required by the task being performed as determined by EM30 plating personnel or as specified on the EM30 work request.

9 TOOLS, EQUIPMENT, AND MATERIALS

9.1 Mitutoyo Digital Micrometer, Serial Number 0122190; or equivalent

9.2 Mitutoyo Digital Calipers, Serial Number 0580709; or equivalent

9.3 Starrett Gauge Blocks, # M636978; or equivalent, Calibration Category I

9.4 Thickness Gauge Set, # M652805; or equivalent, Calibration Category I